

DERIVATION OF EIGENVECTORS FOR SPATIAL PROCESSING IN MIMO COMMUNICATION SYSTEMS

ABSTRACT

Techniques for deriving eigenvectors based on steered reference and used for spatial processing. A steered reference is a pilot transmission on one eigenmode of a MIMO channel per symbol period using a steering vector for that eigenmode. The steered reference is used to estimate both a matrix $\underline{\Sigma}$ of singular values and a matrix \underline{U} of left eigenvectors of a channel response matrix \underline{H} . A matrix $\tilde{\underline{U}}$ with orthogonalized columns may be derived based on the estimates of $\underline{\Sigma}$ and \underline{U} , e.g., using QR factorization, minimum square error computation, or polar decomposition. The estimates of $\underline{\Sigma}$ and \underline{U} (or the estimate of $\underline{\Sigma}$ and the matrix $\tilde{\underline{U}}$) may be used for matched filtering of data transmission received via a first link. The estimate of \underline{U} or the matrix $\tilde{\underline{U}}$ may also be used for spatial processing of data transmission on a second link (for reciprocal first and second links).